Name:_____ **Biology Final Exam**

1. **What is the structure of a DNA molecule?**
   a. Double Helix
   b. Single Strand
   c. Varied
   d. Circular

2. **Which of the following nitrogen bases would <u>not</u> be found in DNA?**
   a. Thymine
   b. Cytosine
   c. Uracil
   d. Adenine

3. **What is a structural <u>difference</u> between DNA and RNA?**
   a. DNA is double stranded, while RNA is single stranded
   b. RNA is double stranded, while DNA is single stranded
   c. DNA utilizes 16 nitrogen bases, while RNA uses 4.
   d. There are not structural differences, they are exactly the same.

4. **What are the 3 parts of every DNA nucleotide?**
   a. Deoxyribose Sugar, Phosphate, Oxygen Bases
   b. Deoxyribose Sugar, Phosphate, Nitrogen Bases
   c. Ribose Sugar, Phosphate, Oxygen Bases
   d. Ribose Sugar, Phosphate, Nitrogen Bases

5. **Transcribe the following DNA sequence, ACT, into a RNA sequence.**
   a. UGA
   b. TGA
   c. TCU
   d. UGU

6. **Where does the process of transcription occur?**
   a. Ribosome
   b. Nucleus
   c. Cytoplasm
   d. Rough Endoplasmic Reticulum

7. **The DNA molecule is broken apart by which of the following:**
   a. Enzymes
   b. Plasmids
   c. Phages
   d. Ribosomes

8. **Which organelle is responsible for translation?**
   a. Ribosome
   b. Nucleus
   c. Mitochondria
   d. Cell Wall

9. **Which of the following is <u>not</u> part of protein synthesis?**
   a. Replication
   b. Translation
   c. Transcription

10. **The codon is located on the_____?**
    a. mRNA
    b. tRNA
    c. rRNA
    d. DNA

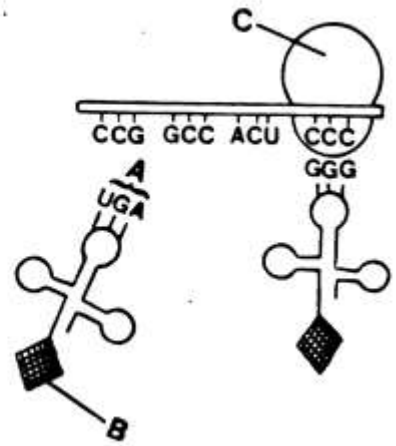
11. **The genetic code is based upon reading how many bases at a time?**
    a. One
    b. Two
    c. Three
    d. Four

Identify the labeled structures on the following diagram of translation.

12. Part A is the _____.
13. Part B is the _____.
14. Part C is the _____.

Word Bank

tRNA	mRNA	amino acid
anticodon	ribosome	codon



15. **Proteins are made from combinations of 20 different _____.**
    a. Amino Acids
    b. Fatty Acids
    c. Monosaccharide's
    d. Nucleotides

16. **One similarity between DNA and mRNA is that they both _____.**
    a. Carry genetic info in base sequences
    b. Contain the nitrogenous base Uracil
    c. Double-stranded
    d. Have the same sugar

17. **Which of the following sequences accurately describes protein synthesis?**
    a. mRNA → Amino Acid → tRNA → DNA
    b. mRNA → DNA → tRNA → Amino Acid
    c. DNA → mRNA → Amino Acid → tRNA
    d. DNA → mRNA → tRNA → Amino Acid

18. **Gene mutations can be caused by:**
    a. Natural coding errors
    b. Chemical and Radiation Exposure
    c. Viruses
    d. All of the above

19. **If the DNA strand reads CAT TAG, and is now read as CAT TAC, what type of mutation has occurred in this strand?**
    a. Insertion
    b. Deletion
    c. Substitution
    d. Frameshift

20. **What amino acids are coded for by the mRNA "CUCAAGUGC" ? Use diagram below**
    a. Leucine – Tyrosine – Arginine
    b. Glutamic Acid – Phenylalanine – Threonine
    c. Glutamic Acid – Lysine – Cycsteine
    d. Leucine – Lysine – Cysteine

21. **The tRNA anticodons for the codons in the mRNA "CUCAAGUGC" strand would be:**
    a. GAG UUC ACG
    b. GAG TTC ACG
    c. CUC GAA CGU
    d. CUU CGU GAA

22. **Which of the following would represent the original DNA strand from which the mRNA "CUCAAGUGC" strand was made?**
    a. CUC AAG UGC
    b. GAG UUC ACG
    c. GAG TTC ACG
    d. AGA CCT GTA

1. Find the first base of the mRNA codon along the left side of the table.

2. Follow that row to the right until you are beneath the second base of the codon.

3. Move up or down in that section until you are even, on the right side of the chart, with the third base of the codon.

Codons in mRNA

First base	Second base U	Second base C	Second base A	Second base G	Third base
U	UUU, UUC – Phenylalanine UUA, UUG – Leucine	UCU, UCC, UCA, UCG – Serine	UAU, UAC – Tyrosine UAA, UAG – Stop	UGU, UGC – Cysteine UGA – Stop UGG – Tryptophan	U C A G
C	CUU, CUC, CUA, CUG – Leucine	CCU, CCC, CCA, CCG – Proline	CAU, CAC – Histidine CAA, CAG – Glutamine	CGU, CGC, CGA, CGG – Arginine	U C A G
A	AUU, AUC, AUA – Isoleucine AUG – Start	ACU, ACC, ACA, ACG – Threonine	AAU, AAC – Asparagine AAA, AAG – Lysine	AGU, AGC – Serine AGA, AGG – Arginine	U C A G
G	GUU, GUC, GUA, GUG – Valine	GCU, GCC, GCA, GCG – Alanine	GAU, GAC – Aspartic Acid GAA, GAG – Glutamic Acid	GGU, GGC, GGA, GGG – Glycine	U C A G

Original DNA Sequence: **C T C T G G A C T**

23. mRNA Sequence:_____

24. Amino Acid Sequence:_____

Mutated DNA Sequence: **C T C G T G G A C T**

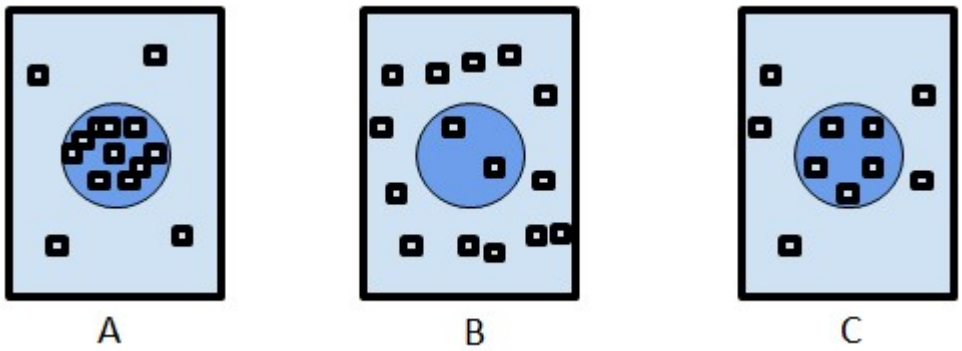
25. What's the DNA sequence change (Circle the change)

26. Mutated mRNA sequence:_____

27. What will be the new amino acid sequence? _____

(Do not translate incomplete codons)

Refer to the following diagram for questions 28-30



28. In scenario A, water would…
A. Move into the cell, because the solution is hypotonic. The cell would swell.
B. Move into the cell, because the solution is hypertonic. The cell would swell.
C. Move out of the cell, because the solution is hypotonic. The cell would shrivel.
D. Move out of the cell, because the solution is hypertonic. The cell would shrivel.

29. In scenario B, water would…
A. Move into the cell, because the solution is hypotonic. The cell would swell.
B. Move into the cell, because the solution is hypertonic. The cell would swell.
C. Move out of the cell, because the solution is hypotonic. The cell would shrivel.
D. Move out of the cell, because the solution is hypertonic. The cell would shrivel.

30. In scenario C, water would…
A. Move into the cell, because the solution is hypotonic. The cell would swell.
B. Move out of the cell, because the solution is hypertonic. The cell would shrivel.
C. Move in and out of the cell without a net change, because the solution is isotonic. The cell would stay the same.
D. Not move in or out of the cell, because the solution is isotonic. The cell would stay the same.

Questions 31 – 41

Match the term with its correct description:

A	energy	G	carrier protein
B	facilitated diffusion	H	channel protein
C	endocytosis	I	transport protein
D	passive transport	J	osmosis
E	active transport	K	equilibrium
F	exocytosis		

_____ Transport protein that provides a tube-like opening in the plasma membrane through which particles can diffuse

_____ Is used during active transport but not passive transport

_____ Process by which a cell takes in material by forming a vacuole around it

_____ Process by which a cell expels wastes from a vacuole

_____ A form of passive transport that uses transport proteins

_____ When energy is required to move materials through a cell membrane

_____ The movement of substances through the cell membrane without the use of cellular energy

_____ Transport protein that changes shape when a particle binds with it

_____ Used to help substances enter or exit the cell membrane

_____ The diffusion of water through a cell membrane

_____ When the molecules of one substance are spread evenly throughout another substance to become balanced

42 A substance (not necessarily biological) that increases the rate of a chemical reaction by reducing the amount of energy needed to start that reaction.

A Catalyst
B Substrate
C Inhibitor
D Enzyme

43 A protein that acts as a biological catalyst

A Catalyst
B Substrate
C Inhibitor
D Enzyme

44 The energy that a system requires before a reaction can take place

A Enzyme-substrate complex
B Optimum pH
C Activation Energy
D Denatured

45 **A(n) _____ lowers the _____ _____ needed to start a chemical reaction.**

A Substrate; Activation Energy
B Enzyme; Activation Energy
C Substrate; Optimum pH
D Enzyme; Optimum pH

46 **True/False: Enzymes are consumed (used up) in biological reactions.**

A True
B False

47 **The biological molecule (reactant in the reaction) that an enzyme acts upon to catalyze the reaction.**

A Active site
B Enzyme
C Substrate
D Inhibitor

48 **This is the location on an enzyme where the enzyme and substrate bind together.**

A Optimum pH
B Active Site
C Enzyme-Substrate Complex
D Substrate

49 **The enzyme and substrate temporarily bind to form the _____.**

A Active Site
B Inhibitor
C Enzyme-Substrate Complex
D Catalyst

50 **Doubling the concentration of an enzyme_____ the reaction rate of a process.**

A Increases
B Decreases

51 **As an enzyme-catalyzed reaction proceeds in time, the reaction rate of the enzyme_____.**

A Increases
B Decreases

52 **When a protein loses its ability to function properly because its shape has been changed, usually by extremes in temperature, pH, or salinity, it is said to be _____**

A Increased
B Decreased
C Denatured
D Catalyzed

53 **Denaturation can be caused by extremes in _____, among other things.**

A Reaction Rate
B Substrates
C Enzyme Concentration
D pH and temperature

54 **Proteins, and enzymes in particular, have range of pH within which they function best, called the _____.**

A Active Site
B Activation Energy
C Optimum pH
D Enzyme-Substrate Complex

55 **When an enzyme cannot function because an inhibitor has bonded to that enzyme's active site, it is called:**

A Competitive Inhibition
B Allosteric Inhibition
C Reversible Inhibition
D Irreversible Inhibition

56 **When an enzyme cannot function because an inhibitor has interacted with a separate site on the enzyme, causing the shape of the active site to change, it is called:**

A Competitive Inhibition
B Allosteric Inhibition
C Reversible Inhibition
D Irreversible Inhibition

57 **What is the ratio of Carbon : Hydrogen : Oxygen in carbohydrates?**

A Greater Than 2:1
B Less Than 2:1
C Exactly 1:2:1
D Exactly 2:1:2

58 **Which of the following is a monosaccharide?**

A Sucrose
B Lactose
C Chitin
D Fructose

59 **What is the reaction that joins monomers together called?**

A Dehydration Synthesis
B Hydrolysis
C Photosynthesis
D Hydrogen Bonding

60 **What is the reaction that breaks polymers apart called?**

A Dehydration Synthesis
B Hydrolysis
C Photosynthesis
D Hydrogen Bonding

61 **What are the bonds between Carbohydrate monomers called?**

A Peptide Bonds
B Glycosidic Linkages
C Hydrogen Bonds
D Ester Bonds

62 **What are the covalent bonds between Lipids called?**

A Peptide Bonds
B Glycosidic Linkages
C Hydrogen Bonds
D Ester Bonds

63 **What are the covalent bonds between Proteins called?**

A Peptide Bonds
B Glycosidic Linkages
C Hydrogen Bonds
D Ester Bonds

64 **What is the carbohydrate storage molecule of animals called?**

A Cellulose
B Chitin
C Starch
D Glycogen

65 **Which is a correct component of The Phospholipid Bilayer?**

A Hydrophobic Lipid Head
B Hydrophilic Phosphate Head
C Hydrophobic Phosphate Tail
D Hydrophilic Lipid Tail

66 **Steroids are characterized by carbon skeletons with how many fused carbon rings?**

A 2
B 6
C 4
D 5

67 **Saturated fats are _____ at room temperature, and are called saturated because_____**

A liquid; they have double bonds
B solid; they have the max amount of fat
C solid; they have the max number of Hydrogen
D liquid; they have single bonds

68 What is the function of Hemoglobin?

A Makes Oxygen in the blood
B Carries Oxygen in the blood
C Removes Carbon Dioxide in the blood
D Stores Carbon Dioxide in the blood

69 Sickle Cell Disease causes which of the following?

A Decreased O_2 carrying capacity
B Decreased life span
C Painful accumulation of cells
D All of the above

70 What cannot denature a protein?

A pH
B temperature
C water
D salt

71 Which is not a component of Nucleic Acids?

A pentose sugar
B R group
C phosphate group
D nitrogenous base

72 Which is not a component of Amino Acids?

A R group
B Carboxyl group
C Amine group
D pentose sugar

Use the following scenario for questions 73-78

Bud wanted to find out the effect that drinking Coke has on sleep. He hypothesized that Coke decreases the amount someone sleeps. He decides to have his entire football team for a sleep over. There are 30 members on the team. He divides the team evenly into 6 groups of 5.

Group A had no Coke.
Group B was given 1 can of Coke.
Group C was given 2 cans of Coke.
Group D was given 3 cans of Coke.
Group E was given 4 cans of Coke.
Group F was given 5 cans of Coke.

All who had Coke were given their amount 1 hour before bedtime. They were all given the same type of Coke, and they all went to sleep at the same time. Then, Bud measured how long each person slept for the night.

73 What is the Hypothesis?

A More Coke causes less sleep
B Less Coke causes less sleep
C How does Coke affect sleep?
D More Coke causes more sleep

74 What is the Independent Variable?

A The type of Coke
B The amount of Coke
C The number of players
D The amount of sleep

75 What is the Dependent Variable?

A The type of Coke
B The amount of Coke
C The number of players
D The amount of sleep

76 What is the Control Group?

A Group A
B Group B
C Group C
D Group D

77 Which is a constant?

A The type of Coke
B The amount of Coke
C The number of players
D The amount of sleep

78 **How many trials does each group have?**

A 1 B 6
C 5 D 0

79 **What is the function of the nucleus?**

A contains and protects DNA B Creates proteins
C it is the powerhouse of the cell D selective permeability in/out of cell

80 **What is the function of the mitochondria?**

A contains and protects DNA B Creates proteins
C it is the powerhouse of the cell D selective permeability in/out of cell

81 **What is the function of the ribosomes?**

A contains and protects DNA B Creates proteins
C it is the powerhouse of the cell D selective permeability in/out of cell

82 **What is the function of the cell membrane?**

A contains and protects DNA B Creates proteins
C it is the powerhouse of the cell D selective permeability in/out of cell

83 **What is the function of the golgi apparatus?**

A packages materials for transport in/out of cell B turns light into usable energy for cell
C point of entry and exit for materials D cleans up cellular waste within cell

84 **What is the function of the chloroplasts?**

A packages materials for transport in/out of cell B turns light into usable energy for cell
C point of entry and exit for materials D cleans up cellular waste within cell

85 **Where are the majority of electrons located in a water molecule?**

A Around Oxygen B Around Hydrogen 1
C Around Carbon D Around Hydrogen 2

86 **What causes water to have surface tension?**

A Covalent Bonds B Ionic Bonds
C Hydrogen Bonds D Ester Bonds

87 **Water is (has) …**

A Polar B Non Polar
C Ionically Bonded D Low Specific Heat

88 **Which of the following is MOST ACCURATE:**

A Eukaryotic cells are simple, Prokaryotic cells are complex
B Prokaryotic cells came before Eukaryotic cells
C Prokaryotic cells are bigger than Eukaryotic cells
D Eukaryotic cells do not have a nucleus, Prokaryotic cells do

89 **Which of the following would be examples of Eukaryotic cells?**

A Plants and Bacteria
B Plants and Animals
C Animals and Bacteria
D Prokaryotes and Animals

90 When you finish working with chemicals, biological specimens, and other lab substances, always

A. Treat your hands with skin lotion.
B. Wash your hands thoroughly with soap and water.
C. Wipe your hands on a towel.
D. Wipe your hands on your clothes.

91 The following footwear is best in the laboratory.

A. Sandals
B. Open-toed shoes
C. Closed-toed shoes
D. Shoes appropriate for the weather

92 Where in chloroplasts are chlorophyll and other photosynthetic pigments located

A Stomata
B Thylakoid Membrane
C Chloroplast
D Mitochondria

93 ATP is created in Photosynthesis and Cellular Respiration for what purpose?

A Energy
B Waste Storage
C DNA Replication
D Membrane Regulation

94 Which of the following is a summary of the photosynthesis light reactions?

A	Uses light and water;	produces oxygen, ATP, and NADPH
B	Uses oxygen, ATP, and NADPH;	produces water and carbon dioxide
C	Uses carbon dioxide;	produces glucose, ADP and NADP
D	Uses glucose, ADP and NADP;	produces carbon dioxide

95 Which of the following is a summary of the photosynthesis dark reactions?

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C	Uses carbon dioxide;	produces glucose, ADP and NADP
D	Uses glucose, ADP and NADP;	produces carbon dioxide

96 Identify the chemical equation of photosynthesis below

A $CO_2 + H_20 + \text{Light} \rightarrow C_6H_{12}O_6 + O_2$
B $C_6H_{12}O_6 + O_2 \rightarrow CO_2 + H_20 + \text{Light}$
C $H_20 + C_6H_{12}O_6 + \text{Light} \rightarrow CO_2 + O_2$
D $CO_2 + O_2 \rightarrow H_20 + C_6H_{12}O_6 + \text{Light}$

97 Identify the chemical equation of cellular respiration below

A $CO_2 + H_20 + \text{Energy} \rightarrow C_6H_{12}O_6 + O_2$
B $C_6H_{12}O_6 + O_2 \rightarrow CO_2 + H_20 + \text{Energy}$
C $H_20 + C_6H_{12}O_6 + \text{Energy} \rightarrow CO_2 + O_2$
D $CO_2 + O_2 \rightarrow H_20 + C_6H_{12}O_6 + \text{Energy}$

98 The data table shows the heart rate of daphnia. Daphnia are small, almost microscopic aquatic organisms. Although they are distantly related to insects, they do not bite or suck blood as parasitic fleas do. The reason they are called fleas is the way they appear to jump through the water in sudden jerks. Some are even roughly shaped like fleas.

Data Table 1

Water Temperature in °C	Heart Rate (beats per minute)
4	94
8	168
12	192
16	232
20	285

.

Which of the following claims is best supported by data evidence from the table?

A The rate of mutation in daphnia varies with temperature.
B The respiration rate in daphnia increases as heart rate increases.
C The heart rate of daphnia increases as the pH increases.
D The increases in daphnia heart rate can triple with increased temperatures.

BONUS

Why do leaves change color in the fall?

What is the net exchange of Sodium and Potassium in the Na/K Pump?